The 193-nm Photodissociation of NCO The 193-nm photolysis of the NCO radical has been investigated.[8] NCO was generated from the reaction of CN + O_2, where the CN was produced by 193-nm photolysis of C_2N_2 close to the nozzle of a pulsed jet. A second 193-nm photon dissociated the NCO radical during the same laser pulse. At this photon energy both the N-CO and the NC-O bonds may break. N(^2D, ^2P) and CO products have been detected using vacuum ultraviolet laser induced fluorescence. Figure 5 shows a portion of the product laser-induced fluorescence spectrum. A direct measurement of the N(^2D):N(^2P) branching ratio yielded an upper limit of 72 +/- 18. The CO vibrational distribution was modeled with prior distributions for each of the contributing channels with co-products N(^4S, ^2D and ^2P). Combination of the results from the prior model and the direct measurement yielded a branching ratio of N(^4S): N(^2D): N(^2P) of (5.1 +/- 1.8) : (93.6 +/- 4.8) : (1.3 +/- 0.3). For the N(^2D) + CO product channel, the average energy disposal into product relative translation (8%) and CO vibration (24%) was determined, leaving 68% of the available energy to appear as CO rotation. This observation suggests that the geometry of the dissociating state of NCO is likely bent.

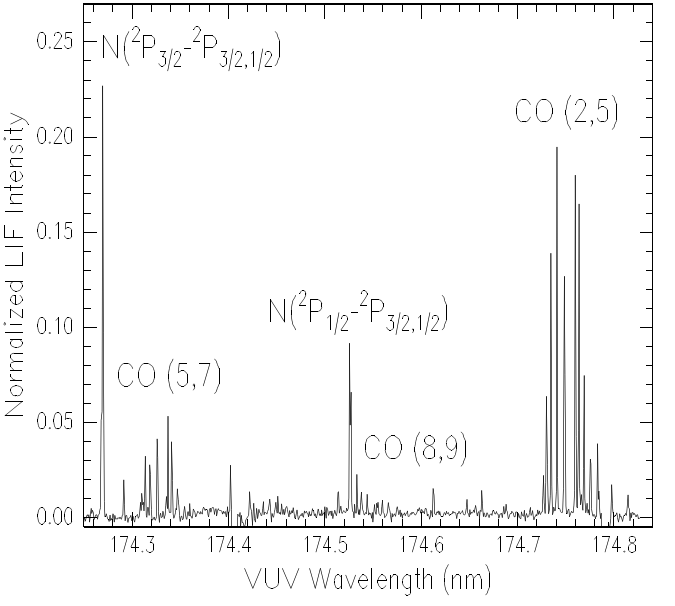

Figure 5 Portion of the product LIF spectrum showing several CO bands and N(^{2}P) transitions.